

REMARKS

Claims 1, 3-13 are pending in the application. Claims 8-13 were withdrawn from consideration.

Rejections under 35 USC §103(a)

Claims 1 and 3-7 were rejected under 35 U.S.C. 103(a) as being obvious over Osaka Gas Co., Ltd. (JP 2002-173689), JP '689 herein, in view of Harihara et al. (US 2002/0114126).

The present invention relates to hydrocarbon materials that can be obtained by heat-treating a polysaccharide-based raw material together with a thermal reaction auxiliary under an inert gas atmosphere, and has the following properties: (a) the hydrogen/carbon ratio (atomic ratio) is within the range of 0.05 to 0.5; (b) the specific surface area determined by the BET method is in the range of 600 to 2000 m²/g; (c) the mesopore volume determined by the BJH method is in the range of 0.02 to 1.2 ml/g; (d) the total pore volume measured by the MP method is in the range of 0.3 to 1.25 ml/g; and (e) the bulk density of an electrode obtained using the hydrocarbon material is 0.60 g/ml or higher, as recited in claim 1.

The hydrocarbon material of the present invention becomes usable as an electrode material of a capacitor and the like by satisfying the above-described conditions, and the use thereof can help to increase the capacitance of a capacitor and reduce the manufacturing cost.

JP '689 discloses a polycyclic aromatic hydrocarbon wherein the hydrogen/carbon ratio (atomic ratio) is within the range of 0.05 to 0.5, the specific surface area determined by the BET method is not less than 1500 m²/g and the 8 to 12Å pore volume measured by the MP method is not

less than 0.2 ml/g (see Claim 1 and Abstract). Although this applies only when pitch is used as raw material, JP '689 also states that the oxygen concentration of pitch is 20 wt% or higher.

However, JP '689 nowhere provides description of requirements (c) and (e) among the requirements (a) to (e) of the present invention.

Regarding the above requirement (c), the Examiner find that "[o]ne of ordinary skill in the art would be motivated to combine JP '689 in view of Hirahara et al. because Hirahara et al. teaches the material having a mesopore volume of 0.05 cm³/g to 0.15 cm³/g provides advantageous electrical properties" (Office Action, page 5, lines 12 to 15).

Further, as the motivation for combining JP '689 in view of Hirahara, the Examiner alleged that "[b]oth JP '689 and Hirahara et al. are in the field of an activated carbon material useful in the electrical electronics industry made from a polysaccharide-based raw material such as coconut" (Office Action, page 5, lines 10 to 12). However, the Examiner's allegation is not correct.

Claim 2 of JP '689 describes a method of manufacturing the hydrocarbon materials of JP '689. According to the method, the hydrocarbon materials of JP '689 can be obtained by "heat-treating hydrocarbon raw material containing pitch as a main component under an inert gas atmosphere." In other words, it is clear that activation treatment is not carried out in JP '689. Therefore, activated carbons are not obtained simply by heat-treating hydrocarbon raw material containing pitch as a main component under an inert gas atmosphere, as in JP '689.

JP '689 also states in paragraph [0006] that "... electroconductive organic polymer materials have been developed.... These materials are polycyclic aromatic hydrocarbon materials. . . ." It is also clear from this statement that the polycyclic aromatic hydrocarbon materials of JP '689 refer to electroconductive organic polymer materials, but not activated carbons.

In contrast, as was acknowledged by the Examiner, the document of Hirahara et al. relates to activated carbons.

As discussed above, JP '689 and Hirahara et al. are completely different from each other in terms of substance. Therefore, there is no reason to apply the mesopore volume described by Hirahara et al. to the invention of JP '689. In other words, the combination of JP '689 and Hirahara et al. does not teach or suggest that "(c) the mesopore capacitance determined by the BJH method is in the range of 0.02 to 1.2 ml/g."

Regarding the above requirement (e), the Examiner alleged that "[t]he limitation 'a bulk density of 0.60 g/ml or higher for an electrode obtained using the hydrocarbon material' is interpreted as a intended use of the claimed hydrocarbon material, and it is found that the material taught by JP '689 is capable of being used in an electrode having a bulk density of 0.60 g/ml or higher."

However, as discussed above, in JP '689, polycyclic aromatic hydrocarbon materials are obtained by "heat-treating hydrocarbon raw material containing pitch as a main component under an inert gas atmosphere". The reason why bulk density of an electrode would not be 0.60 g/ml or higher is as follows:

In Comparative Examples 2 and 3 of the present specification, hydrocarbon material was obtained in accordance with the methods described in Examples 1 and 2 of Japanese Unexamined Patent Publication No. 2001-274044.

JP2001-274044 was submitted with an IDS filed on February 23, 2006. The returned SB/08 form indicates that the Examiner has reviewed this document. Because this document is written in

Japanese, Applicants herewith attach the English translation of Examples 1 and 2 (a portion of paragraphs [0051] to [0054] and [0064]) of JP2001-274044.

It is clear from the attached English translation that in Examples 1 and 2 of JP2001-274044, pitch was heat-treated to obtain polycyclic aromatic hydrocarbon materials. In other words, just like in Comparative Examples 2 and 3 of the present specification, pitch was heat-treated so as to obtain polycyclic aromatic hydrocarbon materials. The electrode bulk densities of Comparative Examples 2 and 3 of the present specification were 0.57 g/cc and 0.55 g/cc, respectively; i.e., less than 0.60 g/ml.

This indicates that the bulk density of an electrode of the polycyclic aromatic hydrocarbon material of JP '689 is less than 0.60 g/ml. Further, because the bulk density of an electrode is small in Comparative Examples 2 and 3 of the present specification, the specific capacitance per unit volume of the electrode is as small as 22.0 in both Comparative Examples 2 and 3. This shows that the present invention has a higher bulk density than that of JP '689, and thus achieves improved specific capacitance per unit volume of the electrode.

It should be noted that Comparative Examples 2 and 3 of the present specification exhibited slightly higher specific capacitance per unit volume of the electrode compared with the Examples. However, because the cell capacity is limited in the technical field of the present invention, the electrode bulk density and the specific capacitance per unit volume of the electrode are critical factors.

For at least these reasons, Claim 1 patentably distinguishes over the combination of JP '689 and Hirahara. Claims 3-7, directly or indirectly depending from Claim 1, also patentably distinguish over JP '689 and Hirahara for at least the same reasons.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,
WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP

/SADAO KINASHI/

Sadao Kinashi
Attorney for Applicants
Registration No. 48,075
Telephone: (202) 822-1100
Facsimile: (202) 822-1111

SK/kn